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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/666,209
Filing Date: September 17, 2003
Appellant(s): EVANS ET AL.

Brian G. Brannon
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 5, 2008 appealing from the Office action mailed May 21, 2008.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant’s statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant’s statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Optimal Technologies, "Operations Review of June 14, 2000 PG&E Bay Area System Events Using Aempfast Software" (Oct 3, 2001), 32 pgs.

Market Wire, "First-Of-Its-Kind Power Project Fires Up In Silicon Valley", October 2002, 2 pgs.

Business Wire, "Innovative Technologies Can Improve National Security; Optimal Technologies Software Able to Make Nation's Power Grid More Secure" (Dec 17, 2001), 3 pgs.

Teresko, John. "Tackling the Energy Crisis", Industry Week, (Jul 16, 2001), 1 pg.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim 1-14 and 19-20 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by **Optimal Technologies ("Operations Review of June 14, 2000 PG&E Bay Area System Events Using Aempfast Software").**

As per claim 1, Optimal is directed to a method for simulating an electric power network having a plurality of transmission-level buses and connected electrical elements and a plurality of distribution-level buses and connected electrical elements, the method comprising: determining a model of the transmission-level buses and connected electrical elements, the model of the transmission-level buses including a plurality of transmission lines and a plurality of transmission electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, the model of the distribution-level buses including a plurality of distribution lines and a plurality of distribution electrical element **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the plurality of transmission lines and the plurality of transmission electrical elements included in the model of the transmission level buses and the plurality of distribution lines and the plurality of distribution electrical elements included in the model of the distribution-level buses **(page 13, Section 3, 5th paragraph)**; and simulating an operation of the electric power network with the single mathematical model **(page 13, Section 3, 5th paragraph)**; and outputting data describing the simulated electric power network **(page 21, Section 8)**.

As per claim 2, Optimal is directed to a method for analyzing an electric power network having a plurality of transmission-level buses and connected electrical elements and a plurality of distribution-level buses and connected electrical elements, the method comprising: determining a model of the

transmission-level buses and connected electrical elements, the model of the transmission-level buses including a plurality of transmission lines and a plurality of transmission electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, the model of the distribution-level buses including a plurality of distribution lines and a plurality of distribution electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the plurality of transmission lines and the plurality of transmission electrical elements included in the model of the transmission level buses and the plurality of distribution lines and the plurality of distribution electrical elements included in the model of the distribution-level buses **(page 13, Section 3, 5th paragraph)**; simulating an operation of the electric power network with the single mathematical model **(page 13, Section 3, 5th paragraph)**; assessing under load flow analysis at least one of a condition and performance of the simulated electric power network **(page 13, Section 3, 1st paragraph)** and outputting data describing at least one of the condition and the performance of the simulated electric power network **(page 21, Section 8)**.

As per claim 3, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical distribution-level real and reactive energy sources connected to one or more of the plurality of distribution-level buses into the single mathematical model **(page 13, Section 3, 1st paragraph)**; and observing impacts and effects across the simulated electric power network of the theoretical distribution-level real and reactive energy sources connected on one or more of the plurality of distribution-level buses **(page 13, Section 3, 2nd paragraph)**.

As per claim 4, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical alternative topologies of the distribution-level portion of the electrical power network into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts

and effects across the simulated electrical power network of the alternative topologies of distribution-level portions of the network **(page 13, Section 3, 5th paragraph)**.

As per claim 5, Optimal is directed to the method of claim 2, further comprising: integrating additional models of theoretical distribution-level loads into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts and effects of load growth across the simulated electrical power network due to the addition of theoretical distribution-level loads **(page 13, Section 3, 5th paragraph)**.

As per claim 6, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical transmission-level real and reactive energy sources connected to one or more of the plurality of transmission-level buses into the single mathematical model **(page 13, Section 3, 1st and 5th paragraph)**; and observing impacts and effects across the simulated electric power network of the theoretical transmission-level real and reactive energy sources connected on one or more of the plurality of transmission-level buses **(page 13, Section 3, 5th paragraph)**.

As per claim 7, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical alternative topologies of the transmission-level portions of the electrical power network into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts and effects across the simulated electrical power network of the alternative topologies of transmission-level portions of the network **(page 13, Section 3, 5th paragraph)**.

As per claim 8, Optimal is directed to the method of claim 2, further comprising: integrating additional models of theoretical transmission-level loads into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts and effects of load growth across the simulated electrical power network due to the addition of theoretical transmission-level loads **(page 13, Section 3, 5th paragraph and page 14, 2nd paragraph)**.

As per claim 9, Optimal is directed to the method of claim 2, wherein the integrating models further comprises: representing actual distribution-level buses and elements having an actual voltage and an actual topology with corresponding models of buses and elements characterized, at least in part, by representations of the actual voltages and the actual topologies of the distribution-level buses and elements **(page 13, Section 3, 2nd paragraph)**.

As per claim 10, Optimal is directed to a method for analyzing performance of a modeled electric power network having a plurality of transmission-level buses and connected electrical elements and a plurality of distribution-level buses and connected electrical elements, the method comprising: determining a model of the transmission-level buses and connected electrical elements, the model of the transmission level buses including a plurality of transmission lines and a plurality of transmission electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, the model of the distribution level buses including a plurality of distribution lines and a plurality of distribution electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the plurality of transmission lines and the plurality of transmission electrical elements included in the model of the transmission level buses and the plurality of distribution lines and the plurality of distribution electrical elements included in the model of the distribution-level buses **(page 13, Section 3, 5th paragraph)**; assessing by load flow analysis a condition and a performance of the modeled electric power network **(page 15, Section 4.1.1)**; adding incremental real and reactive energy sources in locations of the modeled electric power network **(page 13, Section 3, 5th paragraph)**; assessing by load-flow analysis the condition and performance of the simulated electric power network with the added incremental real and reactive energy sources **(page 15, Section 4.1.1)**; determining whether the performance of the modeled electric power network is improved

as a result of the added real and reactive energy sources **(page 16, Section 4.1.1)**; determining a set of added real and reactive energy sources that yields a greatest improvement in network performance **(page 13, Section 3, 5th paragraph)**; characterizing the set of added real and reactive energy sources as specific distributed energy resources **(page 13, Section 3, 5th paragraph)** and outputting data describing the set of added real and reactive energy resources **(page 21, Section 8)**.

As per claim 11, Optimal is directed to the method of claim 10, further comprising, quantifying an improvement in performance of the modeled electric power network due to the set of added real and reactive energy sources **(page 13, Section 3, 5th paragraph)**.

As per claim 12, Optimal is directed to the method of claim 10, wherein adding incremental real and reactive energy sources further comprises: representing the energy sources with models of the energy sources characterized, at least in part, by values of corresponding electric power network actual bus location and actual voltage level **(page 13, Section 3, 2nd paragraph)**; adding to the single mathematical model the models of the energy sources at one of the distribution-level buses and transmission-level buses, wherein the models of real energy sources are added subject to actual limits appropriate for dispatchable demand reductions available on the electric power network, and the real energy sources with reactive energy sources are added subject to actual limits appropriate for generation at load sites within the electric power network **(page 13, Section 3, 5th paragraph)**.

As per claim 13, Optimal is directed to the method of claim 10, wherein determining whether the performance of the modeled electric network is improved as a result of the addition of energy sources comprises: considering selected characteristics of a reduction of real power losses and reactive power losses, improvement in voltage profile, improvement in voltage stability, improvement of load-serving capability, and avoidance of additions of electric elements connected to the network that would otherwise be required **(page 19-20, Section 6.1.2 and Section 6.2)**.

As per claim 14, Optimal is directed to the method of claim 10, wherein characterizing the additions of real and reactive energy sources comprises: creating a plurality of mathematical models each having both distribution-level buses and connected electrical elements and transmission-level buses and connected electrical elements under a plurality of network operating conditions **(page 15, Section 4.1.1)**; determining the additions of models of real and reactive energy sources that achieve the greatest improvement in network performance of the modeled network under each set of operating conditions **(page 13, Section 3, 5th paragraph)**; characterizing each incremental addition of real or reactive energy sources as a discrete generation project, dispatchable demand response project, or capacitor bank project **(page 13, Section 3, 5th paragraph)**; and comparing results achieved under each set of operating conditions to derive model profiles for operation of each discrete added energy source model under each different set of operating conditions **(page 19-20, Section 6.1.2 and Section 6.2).**

As per claim 19, Optimal is directed to a computer readable medium comprising a computer program that when executed in a computer processor implements the steps of: determining a model of the transmission-level buses and connected electrical elements, the model of the transmission-level buses including a plurality of transmission lines an a plurality of transmission electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, the model of the distribution-level buses including a plurality of distribution lines and a plurality of distribution electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the plurality of transmission lines and the plurality of transmission electrical elements included in the model of the transmission level buses and the plurality of distribution lines and the plurality of distribution electrical elements included in the model of the distribution-level buses **(page 13, Section 3, 5th paragraph)**; simulating an operation of the electric power network with

the single mathematical model **(page 13, Section 3, 5th paragraph)**; assessing under load flow analysis at least one of a condition and performance of the simulated electric power network **(page 13, Section 3, 1st paragraph)** and outputting data describing at least one of the condition and the performance of the simulated electric power network **(page 21, Section 8)**.

As per claim 20, Optimal is directed to the computer readable medium of claim 19, further comprising a computer program that when executed in a computer processor further implements the steps of: integrating models of theoretical distribution-level sources of real and reactive energy sources connected to one or more of the plurality of distribution-level buses into the single mathematical model **(page 13, Section 3, 1st paragraph)**; and calculating impacts and effects across the simulated electric power network of the theoretical distribution-level real and reactive energy sources connected on one or more the plurality of distribution-level buses **(page 13, Section 3, 2nd paragraph)**.

(10) Response to Argument

The Appellants argue various reasons why they believe the Optimal reference fails to anticipate the claimed subject matter. Each argument is addressed below.

(A) *Optimal* discloses using Aempfast software which models a power network as a signal mathematical model including integrated transmission and distribution models and calculated interdependencies.

On pages 7-10 of the Appeal Brief, Appellants argue that *Optimal* does not disclose generating a single mathematical model by integrating the model of transmission-level buses with the model of distribution-level buses. The Specification of the instant Application provides no disclosure on what constitutes a "single mathematical model". In the summary of the claimed invention on pages 2-6 of the Appeal Brief, the Appellants refer to several paragraphs in the

Specification but there is no specific definition for a single mathematical model in the Specification. The only recited definition for a single mathematical model is what is in the claim language – a model of transmission and distribution level buses. The *Optimal* reference shows the integration of an entire power network with both transmission and distribution level busses within a single model on page 13.

> Aempfast tightly and simultaneously links optimization of the subject system (i.e., optimized voltage stability and power flow) with full and comprehensive measurement of system resources: i.e., in optimizing the use of system resources, Aempfast analyzes the available real power (P) and reactive power (Q) resources at each and every bus of the system.
>
> It should be noted that while this Evaluation Task study involves system optimization for active and reactive loads and resources, Aempfast also has been designed to analyze and optimize simultaneously for multiple competing system goals, including such other possible goals as generator dispatch based on fuel economy, minimum air emissions, minimum water release or consumption, etc. Aempfast can also be applied to optimize an entire power network of any size (small or large) while making such determinations as (1) proper order of retirement of older generating units based on fuel economy, air emissions, net contribution to system stability, power quality, and power flow, etc.; (2) proper ranking of possible additions to system resources (P and Q generators, capacitors, transformers, transmission and distribution lines, etc.) based on, e.g., capital cost per unit of net contribution to system stability and power flow, etc.; or (3) possible improvements to locations at which devices must be located. In addition, Aempfast can be used to determine accurate locational and marginal based pricing levels and to evaluate power sale contract terms based on the net system effect (i.e., effect on system-wide voltage stability and power flow) of the specific power source and supply in question.

During analysis, Aempfast models all elements of the network and their contributions including both transmission and distribution lines. Therefore, the broadest reasonable interpretation of a single mathematical model of the claim is read on by the prior art.

Appellants further argue on page 8 of the Appeal Brief that *Optimal* only uses the conventional method wherein multiple mathematical models are used - a mathematical model for the transmission level busses and a mathematical model for the distribution level busses. However, assuming that *Optimal* only used conventional load flow methods, by using both models together, and consequently integrating the models and calculating interdependencies, the multiple mathematical models become a single unified mathematical model. While the single mathematical model of an entire power network may contain multiple smaller models of

transmission busses and distribution busses, the single mathematical model remains. Similarly, a software program may consist of multiple smaller programs but remains in it of itself a single software program. Furthermore, at the atomic level of the power network system, describing a single property of a single bus itself requires a mathematical model. Page 10 of *Optimal* reads in part:

> 5. Optimal believes (but has not confirmed) that all measures identified for this study could have been implemented in the course of a few hours. Aempfast is capable of more fundamental system optimization involving measures that require equipment movement or adjustment or capital improvements, but these capabilities have not been used in this study.
> 6. In normal operation of a network, the voltage at one bus is fixed. The voltage at all other buses is determined by the physical parameters of the equipment used to conduct electric current throughout the network. Conversely, if the voltage at a second bus is fixed, the flow between the fixed buses will be increased or decreased and current will flow along alternate paths. A number of fixed voltage buses may be used to interfere with the normal flow of current, or stated otherwise, to control the flow of current in the network. The locations of control buses are strategically selected. <u>Determining the voltage of each of the control buses is a mathematically complex problem</u>, which must include considerations such as power quality and statutory requirements.

However, that does not prevent the entire distribution level of busses or the entire power network of distribution and transmission level busses to be viewed as a single mathematical model of themselves.

Furthermore, while *Optimal* does perform an analysis using conventional load flow methods, it also performs analysis and models a power network using a different method of Aempfast software. *Optimal* clearly distinguishes the Aempfast method from the conventional load flow methods on page 22.

8.1 Analysis Using Traditional Load Flow Tools

Using traditional load flow tools, Optimal increased Bay Area system P and Q loads on the un-optimized June 14, 2000 PG&E System, maintaining constant power factors, until system voltage collapse occurred. See Table 5, below. At collapse, 59.8 MW of generation capacity remained available in the PG&E System. At collapse the system consumed 375.6 MVAr above reactive power (Q) consumed at the base case. This increase in system MVAr loss accelerated the system voltage collapse. At system collapse, the NEWARK D bus (30630), a high voltage PG&E System backbone bus, had dropped to 216 kV, an extremely sharp drop (12 kV, or over 5%, down from 228 kV) for such a key bus. A pending voltage collapse is indicated at the 225 - 227 kV level. This indicates that 227 kV is the reasonable voltage level at which to begin load shed. Optimal confirms from this data that the unplanned June 14 blackout event was the result of voltage collapse, and not the result of a demand overload relative to overall available PG&E System generating capacity. Optimal concludes that the actions Cal ISO and PG&E took on June 14, 2000 to prevent Bay Area System collapse were the best that could be taken based on the traditional analytical tools their engineers then had available.

8.2 Analysis Using Aempfast

As summarized above, using traditional analytical tools, Cal ISO and PG&E were unable to identify and effectively resolve system congestion and related conditions that inhibited power flows needed to maintain voltage stability at critical points of the System, including the Bay Area, on June 14, 2000. Using Aempfast, however, Optimal confirmed that on that date the PG&E System had sufficient generation and other system resources, if properly adjusted and controlled, to withstand voltage collapse in the Bay Area.

Optimal applied Aempfast's Optimizer to identify (1) the sources of such congestion and related conditions on the June 14, 2000 PG&E Bay Area System, and (2) specific, easily-accomplished measures for alleviating such conditions and assuring adequate power flows throughout the System to maintain voltage stability. The primary solutions involved simple "re-controlling" (i.e., adjusting the controls) of the PG&E System "control buses" available to Cal ISO at the time. (Four hundred and twelve (412) of the total of 2506 buses on the PG&E System are identified and used as "control buses" through which the Bay Area System is monitored and managed.) [Note: In addition, the Aempfast Optimizer identified one smaller PG&E System generator that was causing congestion and could have been shut down to improve system power flows. For the purpose of this study, the generator was left running (i.e., unchanged from the data supplied).] Aempfast optimization did not add any system generation or other resources as "system mitigations."

On pages 8-10 of the Appeal Brief, Appellants argue that the Aempfast software disclosed in *Optimal* only formats data files. While pages 16-18 of *Optimal* are focused on data formatting steps, these steps are not what anticipate generating a single mathematical model from distribution and transmission models. That is on page 20 of *Optimal* with the Aempfast Optimization and Analysis wherein optimization requires a single mathematical model *based on and generated from* the data file, including both distribution and transmission models.

Furthermore, Appellants' argument on page 8 of the Appeal Brief that no additional resources are added and therefore Aempfast does not integrate distribution and transmission models is unpersuasive. While the case study of the Bay Area network was optimized without

needing to add new resources, this was done due to a directed of the study (page 8, 1.1.1.2.c). However, this does not mean that the software used by *Optimal*, Aempfast does not have this capability. In fact, it does. On page 17 of Optimal:

> **4.3.2 Study Phase 2 - Baseline Bay Area System Analysis**
>
> The purpose of Phase 2 is to improve Bay Area System operation using the Aempfast analysis tools, but using only active and reactive resources available to Cal ISO and PG&E on June 14, 2000. Consistent with the study directives, Optimal has included no resources that were not already immediately available to PG&E and Cal ISO at the time of the study event.
>
> Comment: The addition of strategic resources as indicated by Aempfast is not included in the scope of this Evaluation Task study, but is to be fully included within Task X. See footnote 8 on page 13.

On pages 9-10 of the Appeal Brief, Appellants argue that use of a data file to analyze a power network cannot be construed as anticipating a single mathematical model. However, the definition of a model is “a schematic description of a system, theory, or phenomenon that accounts for its properties and may be used for further study of its characteristics” as per the American Heritage College Dictionary. A data file processed by an optimizer that calculates relationships between the data values effectively describes a system and accounts for the properties of the system. See page 20 of *Optimal*. Furthermore, *Optimal* uses the Aempfast Optimizer to further study characteristics of the power network system (pages 22-23, Discussion of Study Results, particularly Section 8.2 and 8.2.1). Given the broadest reasonable interpretation, *Optimal* fully anticipates the claimed invention of a single mathematical model of a power network integrating models of both distribution and transmission busses.

(B) *BusinessWire* and *Teresko* provide further evidence of the inherency of single mathematical model of a power network as claimed within the Aempfast software used in Optimal.

On pages 10-12 of the Appeal Brief, while Appellants have provided portions of *Teresko* and *BusinessWire* that do not evidence a single mathematical model of a power network by only discussing the benefits of Aempfast, they have conveniently ignore passages of said articles that do prove a single mathematical model.

Teresko reads in part:

> Entrepreneur Roland Schoettle thinks so, and his Calgary, Alta., Canada, Optimal Technologies International Inc. has developed optimization software called Aempfast to address the power crisis. Using proprietary algorithms, Aempfast can analyze, optimize, and identify constraints in the flow of electricity through the power grid.

And further reads:

> *Chronicle*: "What I think Optimal has . . . is an algorithm that people have attempted to develop for 50 years.")
>
> Barbara Barkovich, energy and utility regulatory consultant, Barkovich & Yap, Oakland, Calif., points to the ability of Schoettle's software "to optimize the system on the basis of frequent updates—which current systems can't do. Instead of running

a day-long traditional power-flow-optimization model, Aempfast has the ability to look at all the contributions made by each element of the grid on a real-time basis."

Last month Optimal's Benicia, Calif., organization entered into a contract with California to provide further proof of what its proprietary algorithm can do. The contract will test the software's analysis of power-grid data from the first unscheduled blackout that occurred on June 14, 2000, as a result of undervoltage at a substation. Test results, due soon, will determine if Aempfast would have prevented the problem.

(The prior art *Optimal* is the documentation of the analysis performed for the California contract mentioned in *Teresko*.)

Whereas *BusinessWire* reads in part:

Abstract (Summary)

Optimal's new Aempfast(TM) (pronounced aim-fast) software, now being tested, has the unique ability to "see" the power grid as a whole and in great detail. Aempfast can swiftly find blockages in power flow, identify and direct system adjustments eliminating the congestion points, and reroute power -- in seconds, as opposed to hours -- thereby avoiding blackouts and brownouts. "This software is fundamental for electric power contingency planning and crisis management," said Roland Schoettle, founder and CEO of Optimal Technologies.

In a recent address to electric power strategists at the National Academy of Engineering, Schoettle reported on Aempfast's critical applications for both normal grid operations and emergency planning and response functions. The Aempfast software will allow power grid managers to optimize electricity flows -- in real time -- to clear up power flow congestion, make transmission and distribution more efficient, reduce grid dependence on the volatile electricity spot market, cut fuel costs and air emissions, and seamlessly integrate distributed generation into the power grid. The same powerful capabilities give Aempfast special applications in planning for, and responding to, power grid emergencies.

and further reads:

> The Aempfast power system management software has demonstrated the unique ability to create a more secure, robust, and resilient national power grid by:
>
> -- Enhancing normal operating performance and stability of local
>
> and regional grids
>
> -- Enabling sharply advanced emergency response and contingency
>
> planning for local, regional, and national power grids:
>
> -- Complex, optimized response strategies, not identifiable
>
> by other technologies, involving diversification,
>
> flexibility, redundancy, mutual support, and sharing among
>
> the grid's power generation, transmission, and
>
> distribution resources

From the articles, it is quite clear that Aempfast software models a power network using a single mathematical model that integrates both transmission and distribution networks and further models the interdependencies of the elements within the power network.

Furthermore, the benefit conferred by Aempfast appear to be the same as the benefits proffered by Appellants claimed invention as noted on page 7 of the Appeal Brief.

> These aspects of the claimed invention promote comprehensive assessment of the effects of an electric power network by integrating distribution elements with transmission elements in a single mathematical model which also accounts for the interdependency between a plurality of transmission lines, a plurality of transmission electrical elements, a plurality of distribution lines and a plurality of distribution electrical elements. These aspects of the claimed invention permit greater detail in electric power network analysis by direct inclusion of interdependencies between transmission-level effects from transmission lines and transmission electrical elements and distribution-level effects from distribution lines and distribution electrical elements using an integrated model of transmission-level buses and distribution-level buses, improving the accuracy of the evaluation. Conventionally, separate models are used to simulate distribution and transmission, preventing inclusion of relationships between transmission elements and distribution elements in power network analysis.

Therefore, *Teresko* and *BusinessWire* provide further evidence of the inherent single mathematical model of a power network as claimed.

(C) Appellants have failed to provide evidence to prove that Aempfast in *Optimal* does not disclose a single mathematical model of a power network as claimed.

On pages 12-14 of the Appeal Brief, what Appellants allege as blanket statements of the type of model Optimal uses are in fact detailed descriptions of the functionality of Aempfast in Optimal that any ordinary person skilled in the art would understand as an inherent structure of a single mathematical model of a power network. See Section (A) above for further details. It is particularly curious that Appellants appear to feign ignorance in light of these detailed disclosures, particularly given their experience in the field of modeling power networks. *Market Wire* discusses a strategic planning project in October 2002 using the Aempfast software.

> Optimal Technologies International Inc., leading provider of end-to-end power grid optimization technologies and services, today announced the official kickoff of a distributed energy resource (DER) strategic planning project in Silicon Valley that will utilize its unique technology.
>
> "This project, the first of its kind in the world, will showcase Optimal's breakthrough power grid optimization technology, called AEMPFAST(TM)," said Roland Schoettle, founder and CEO, Optimal Technologies. "For the first time since Thomas Edison introduced the idea of an interactive power grid, it is now possible to truly understand how it can be achieved because of the new capabilities AEMPFAST provides. Using AEMPFAST, Optimal will optimize a combined transmission and distribution (T&D) network under projected scenarios for adding distributed energy resources. With these new capabilities, we will be able to evaluate possible combinations of distributed energy additions assuring they provide grid benefits at the most effective cost. We're pleased to be part of such an exciting project in a location -- the heart of Silicon Valley -- that will benefit greatly from this work."

> The project was initiated by New Power Technologies (NPT) and Cupertino Electric Inc., two Silicon Valley businesses that believe the project will demonstrate a dramatic solution to the Silicon Valley's critical power problems. It received enthusiastic support from the Silicon Valley Manufacturing Group (SVMG), a prominent trade association, its Energy Committee, and Silicon Valley Power (SVP), the City of Santa Clara municipal utility whose T&D grid is the focus of the project. The California Energy Commission provided funding for the project through its Public Interest Energy Research (PIER) Program.
>
> Peter Evans, NPT's president, helped develop the project and will oversee it. "This project breaks new ground in the sense that it integrates the transmission and distribution grids, local generation, and local loads into one interactive system for analysis," Evans said. "In order to fully understand the value of distributed energy resources as applied in any system, this project will evaluate thousands of distributed energy resource scenarios for the SVP integrated grid. For each scenario, we will apply multiple network performance indicators, including system voltage stability, power quality, and losses of active and reactive power. Our ability to do this effectively will depend on AEMPFAST's power system optimization design and functionality." Evans added that AEMPFAST's remarkable speed in optimizing and analyzing the huge data sets that represent each possible system scenario, and the precision and accuracy of its solutions, solidify the proposed approach. "No other software product has AEMPFAST's performance capabilities, and this project couldn't be as successful without such capabilities."
>
> Steve Schumer, vice president of technology for Cupertino Electric and co-developer of the project with Evans, added, "As members of the SVMG Energy Committee, we're pleased to have this opportunity to introduce a unique approach that not only applies to Silicon Valley's system, but to electric power grids world wide."

Specifically as Appellants Evans and Schumer had first hand knowledge of and experience with Aempfast software as discussed in Optimal, it is unclear why Appellants have not chosen to demonstrate the Examiner's position as incorrect by easily providing evidence that Aempfast only uses "conventional" methods of modeling a power network rather than the "groundbreaking" method of using a single mathematical model of a power network with transmission and distribution interdependencies.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(12) Conclusion

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Suzanne Lo/

Patent Examiner, GAU 2128

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